USC Dornsife College of Letters, Arts and Sciences

HBIO302L – Nutrition and Metabolism (4 units)
Fall 2022
Lectures: Tuesday/Thursday; *9:30-10:50 am*
Location: ZHS 352

Labs: **Monday:** 8:00-10:50am
Monday, 2:00-4:50 pm;
Wednesday, *8:00-10:50 am*;
Wednesday, *11:00-1:50 pm*;
Wednesday, *2:00-4:50 pm*;
Thursday, *11:00-1:50 pm*
Location: B12

•Instructor: Helaine Lopes, PhD, Professor (she/her/hers)
Office: PED 109
Office Hours: by appointment

By appointment: Office hour appointments should be organized in advance via email correspondence with Dr. Lopes. These office hours will be on Zoom, unless arranged otherwise.

Contact Info: lopes@usc.edu
I will respond to all emails within 48 hours either individually via email or as a group in class (if the topic is relevant for all students attending the class). For answers to complex questions, the student may be encouraged to schedule a visit during office hours.

•Lab Director: Anh-Khoi Nguyen, PhD (he/him/his)
Office: PED 109
Office Hours: by appointment
Contact Info: agnguyen@usc.edu
I will respond to all emails within 48 hours via email.

•Lab Instructor: Bara Floyd, MS (she/her/hers)
Office: PED 109
Office hours: TBA
Contact Info: gbfloyd@usc.edu
I will respond to all emails within 48 hours either individually via email or as a group in class (if the topic is relevant for all students attending the class).

•Lab Instructor: Lauren Visconti, MS
Office: SHS 170
Office hours: by appointment
Contact info: lmv_967@usc.edu
I will respond to all emails within 24 hours.

•Peer Tutor: Cindy Gu
Contact Info: cindygu@usc.edu

Course Description

•Gastrointestinal physiology and energy metabolism as it relates to macronutrient intake. Theories and principles of nutrition and their impact on metabolic regulation. This course is a pre-requisite for HBIO 407L.
•This course is intented to introduce HBIO majors to the physiological principles associated with the digestion and absorption of macronutrients as well as the chemical basis of the major catabolic and anabolic pathways associated with carbohydrate and lipid metabolism. Food digestion and absorption as well as cellular metabolism are the foundation of life; food intake dictates energy intake and cellular metabolism regulates energy output. Upon completion of this course, students should be able to think about energy intake and output at the cellular level and be able to assess the impact of dysregulation on disease development.

Learning Objectives

•to describe the structure/function of selected cells, tissues, organs and organ systems of the gastrointestinal tract
•to describe the metabolic pathways associated with lipid and carbohydrate metabolism
•to relate the knowledge of nutrition and metabolism to a healthy lifestyle
•to correlate circulating metabolic markers with dietary intake
•to develop and execute research hypothesis related to nutrition and health
•to use research articles to defend a scientific argument
•to complete a research experiment using biological instrumentation, perform statistical analysis and report data
•to recommend ways by which dietary and physical activity interventions in different socioeconomic environments could help resolve the obesity epidemic
•to discover and discuss the impact of human diversity as manifested by age, disability, gender, ethnicity and social status on nutritional deficits

Prerequisite:

•BISC 220L or BISC 221L

Technological proficiency and Hardware/Software required

•Because the possibility always exists that we will have to go back to virtual classes, you should have an internet-enabled device with browser capabilities, such as a tablet or laptop/desktop computer.
•This course requires the use of Blackboard whether the class will be in person or virtual. Blackboard will be your gateway to access Zoom (if we have to give lectures virtually) and to view your grades. Blackboard will also be the repository of lecture slides and lectures on Zoom if we go virtual. If classes go online, students will need to download Respondus Lockdown Browser to take all scheduled exams. Information for these resources can be found at the ITS Customer Support Center: https://itservices.usc.edu/contact/ and https://blackboardhelp.usc.edu/.
•This course also requires the use of Microsoft Word, Excel and Powerpoint.

•USC Technology Rental Program (https://itservices.usc.edu/spaces/laptoploaner/): Students who are in need of resources to participate in this class can apply to the university's equipment rental program. The Student Basic Needs team will work with you to distribute equipment (if you are eligible). Please visit https://studentbasicneeds.usc.edu/resources/technology-assistance/ to apply and for more information.

Required Readings and Supplementary Materials

•When ordering books online from the bookstore, please go to usctext.com and you can either select in-store pick-up or have them shipped to their home.

1) **The Science of Nutrition,** 5th edition, Thompson, J.L., Manore, M,M, and Vaughan, L.A. Benjamin Cummings, San Francisco, CA, 2016.

The Science of Nutrition textbook is available at the Bookstore, on Amazon or if you go directly to the publisher's website. Amazon has this book available as e-text for rent or download.

2) **Biochemistry (Illustrated Review),** 7th edition, Ferrier, D. Wolters Kluwer/Lippincott Williams & Wilkins, United Kingdom.

The Biochemistry (Illustrated Review) textbook can be purchased at the bookstore, on Amazon or if you go directly to the publisher's website. Amazon has this book available as e-text for rent or download. This book can also be found under the "View Online" option of the link below which is linked to the USC library. Before access is provided, you will be prompted for your USC credentials.

https://uosc.primo.exlibrisgroup.com/permalink/01USC_INST/hs9vaa/alma991043480725303731

3) **Lab Manual; available in the bookstore**

4) **Some class information** will be posted on Blackboard usually the night before class. When needed, further resources including research articles will be provided via Blackboard.

Sharing of Course Materials Outside of the Learning Enviroment is Strictly Prohibited

•USC has a strict policy (SCampus Section 11.12[B]) that prohibits sharing of ***any*** synchronous and asynchronous course content outside of the learning environment. Any student who violates this policy will be prosecuted to the maximum extent allowable by the USC Student Conduct Code, including failure of the course and suspension from the University.

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Description and Assessment of Assignments

•Class material will be evaluated via one homework assignment (Poster – see description below), one Powerpoint presentation (group project – see description below), two exams (one midterm & one final) and one lab grade.
•Grades will be recorded in the Blackboard gradebook except for the final exam.

Exams

•Exams will be a combination of multiple-choice, true or false, short-answer response, and problem-solving questions. There will be two exams; one midterm and one final exam. The exams will provide a summative assessment of your understanding of the material covered in class. The final exam will be cumulative.

•Class notes and textbook information will form the basis of the material that will be on the exams. If you attend class regularly, you will be updated on the status of lecture notes and course material/announcements.
•Every week, students will be given a short quiz to practice the material and to become familiar with the types of questions that will be asked in the exams. These formative assessments will NOT be graded. I will provide the correct answers and we will discuss those in class but students will not be graded on this effort.
•A midterm exam can be taken after the specified date **ONLY** if the student has a **documented** excuse. A request to take a make-up exam must be accompanied by evidence of necessity (illness, travel with a USC team). Make-up exams will be different from the scheduled exam and will be proctored by different personnel.
•The final exam is ***cumulative***. The final exam will not be available for review. Final grades will NOT be posted on Blackboard.

Pathway Poster

•Each student will produce a poster via the use of a poster board. The poster will include all of the pathways discussed in class (See full description below).

Presentation

•For this assignment, groups of 5 students will be established. Each group will create a Powerpoint presentation that will explain the goal(s), methods, results and conclusions of a research article on a topic chosen from a list of real-world application of nutritional issues. The list will be provided by Dr. Lopes. There are three phases associated with this presentation (see full description below):

1) **Students will provide the names of the students in their group and the topic** that they have chosen. The topic will be chosen from a list provided by Dr. Lopes.
2) **Each group will meet with Dr. Lopes to discuss the list of articles** that they have read and which article they have chosen to use for their presentation. **Students will provide Dr. Lopes with the list of articles** that they have read.
3) **Students will present to the class.** All students must participate in the presentation. A rubric will be made available for all presentation components. **The class will vote to select the "Best Presentation" award.**

Labs

•The lab grade will be calculated from lab reports and exams, which will be explained in detail by your lab TA or lecturer.

Grading Breakdown

Assignment	% of Final Grade
Pathway Poster	15
Midterm 1	15
Topic presentation	20
Lab Grade	25
Final Exam	25
	100

Grading Timeline

•**All graded work will be returned no later than one week after the submission deadline.**

Late work

•If the submission deadline for an assignment is missed, the assignment may be submitted up to one week late. A **20% grade deduction** will be applied to all late assignments.

•If you miss submitting work for an unavoidable, documented, and serious reason, discuss the situation with me during office hours.

Assignment Submission

•The assignments associated with the Powerpoint presentation should be submitted to me via email (group list, topic selection, article list, Powerpoint slides).

•The Poster should be submitted to me in person on the morning of the due date (before class) and delivered to PED 109

Grading Scale

•A grade of zero will be applied to submitted work that does not comply with the USC standards of academic conduct. Such work may not be resubmitted for a new grade.

•Exams and lab grades will not be given a letter grade. **Only the final grade will be given a letter grade.**

•**Grades are NOT rounded or curved.** A grade of 86.99 is a B grade. A final grade of 89.99 will **NOT** be reflected as an A-. It is always difficult to miss a grade boundary by a small amount. But to round up would defeat the purpose of having an objective grading scale and it would also mean that announcing a specific grade boundary is not accurate. That would be unfair. Therefore, I make the grade boundary objective and sharp. **There are NO exceptions.**

•Course final grades will be determined using the following scale:

A	**94-100**
A-	**90-93.99**
B+	**87-89.99**
B	**83-86.99**
B-	**80-82.99**
C+	**77-79.99**
C	**73-76.99**
C-	70-72.99
D+	**67-69.99**
D	**63-66.99**
D-	**60-62.99**
F	**≤59.9%**

Technology in the classroom

•You may use personal electronic devices (laptops, ipads) for academic purposes directly related to the class. Students using a device for purposes not directly related to the class will be required to put the device away. There are times that I will request that all devices are put away to ensure focus on class activities.

•Please turn off or disable all cell phones or other electronic communication devices during class time.

2% Extra credits via seminar attendance

•If you decide to do this option for extra credit, **you must send an email to Dr. Lopes by Sept 9, 2022** to let her know of your decision.

1) **JEP:** At this point in time, the JEP program has not confirmed whether BIO 302 will have a JEP option. I will update this aspect of the syllabus as soon as JEP informs me of their decision.

2) **Seminar attendance:** An extra credit option of maximum 2% will also be available by attending 4 research seminars either on UPC or on HSC. **Two (2) of those seminars should be HBIO seminars.** The seminars should be related to some aspect of biology or physiology. For each seminar, students will have to attend the seminar and to write a 1 page summary of what was presented by the researcher. **The 1-page summary should include an introduction, an organized summary of the research presented and a conclusion.** For each seminar attended and 1-page summary submission, students can be given up to 0.5% for a grand total of 2% points (for 4 attended and summary). Summaries **MUST** be emailed to Dr. Turcotte **within 1 week of the seminar.** Students must clearly explain which seminar was attended (see description below).

Classroom Norms

•To promote a respectful, professional, and productive classroom environment, the following expectations will be maintained during all class sessions.

- •Do not interrupt when someone else is speaking
- •You can criticize ideas, but not people
- •Avoid inflammatory language
- •Either support assertions with evidence, or speak from personal experience
- •Do not dominate the discussion
- •Make a single point each time you speak, rather than making a series of statements at once

Course Schedule: A Weekly Breakdown

Date	Lecture Topic	Lab	Reading Chapters	
			Thompson	Ferrier
Aug 23	Course Overview; Digestion	Lab Introduction & Statistics	3	
Aug 25	Digestion/Absorption		3	
Aug 30	Digestion/Absorption	Journal Club	3	
Sept 1	Digestion/Absorption of Carbohydrates		4	7
Sept 6	Digestion/Absorption of Carbohydrates		4	7
Sept 8	Digestion/Absorption of Proteins **Topic & Group selection finalized**		6	19
Sept 13	Digestion/Absorption of Lipids		6	15, 17
Sept 15	Digestion/Absorption of Lipids		5	15, 17
Sept 20	Digestion/Absorption of Lipids		5	15, 17, 18
Sept 22	Glycolysis/Glycogenolysis			8, 9, 11
Sept 27	Glycolysis/Glycogenolysis			8, 9, 11
Sept 29	**Midterm**			
Oct 4	Introduction to metabolic pathways			16
Oct 6	Glucose uptake/glycolysis			16
Oct 11	Glycogenolysis/beta oxidation			6, 9
Oct 13	**FALL RECESS**			
Oct 18	Beta oxidation/lipolysis			10, 11
Oct 20	Lipolysis/fructose/E shuttles/KC			16
Oct 25	ETC – **list of articles dues** **Point person for each group**			
Oct 27	ATP counts/GS/Gluconeogenesis			
Nov 1	Gluconeogenesis/FAS/TGS			
Nov 3	Regulation: Carbohydrate Pathways			
Nov 8	Regulation: Lipid Pathways			
Nov 10	Healthful Diet		2, 4, 5, 6	24, 27
Nov 15	Healthful Diet		2, 4, 5, 6	24, 27
Nov 17	**Presentations**			
Nov 22	**Presentations - Metabolic pathway Poster due**			
Nov 29	**Presentations**			
Dec 1	**Presentations**			
Dec. 8	**11 AM -1 PM - Final Exam**			

Statement on Academic Conduct and Support Systems

Academic Conduct:

Plagiarism – presenting someone else's ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Part B, Section 11, "Behavior Violating University Standards" policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, policy.usc.edu/scientific-misconduct.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org
Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu
Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support
Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776
dsp.usc.edu
Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710
studentaffairs.usc.edu/ssa
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101
diversity.usc.edu
Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call
dps.usc.edu, emergency.usc.edu
Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call
dps.usc.edu
Non-emergency assistance or information.

HBIO 302L: Nutrition and Metabolism
Assignment: PowerPoint Presentation

Learning Objectives:
▪to use research articles to defend a scientific argument
▪to recommend ways by which dietary and physical activity interventions in different socioeconomic environments could help resolve the obesity epidemic
▪to discover and discuss the impact of human diversity as manifested by age, disability, gender, ethnicity and social status on nutritional deficits

Assignment Description:
For this assignment, groups of 4-6 students will be established. Each group will create a PowerPoint presentation that will explain the goal(s), methods, results and conclusions of a research article on a topic chosen from a list of real-world application of nutritional issues. The list of topics will be provided by Dr. Turcotte.

Steps:
There are three phases associated with this presentation.

1) **By September 8th: Each group will provide the names of the students in their group and the topic** that they have chosen. The topic will be chosen from a list provided by Dr. Lopes.
2) **By October 25th: Each group will have met with Dr. Lopes to discuss the list of articles** that they have read and which article they have chosen to use for their presentation. **Students will provide Dr. Lopes with the list of articles** (see below) that they have read to make this decision. Use the information provided by the science library representative, Alvaro Quezada, during his class presentation to find articles.
3) **By November 16, 21, and 28 and 30th: Each group will send to Dr. Lopes via email the PowerPoint presentation that they have created.**
4) **November 17, 22, and 29 and December 1st: Students will present to the class.** All students must participate in the presentation. The rubric below provides information about the factors that will be evaluated during the presentation.
5) **December 1st: The class will vote to select the "Best Presentation" award.**

List of articles (due latest Oct 25th):
▪should include at least 15 articles that were read and considered for the presentation. These should be original research articles; NOT REVIEW articles.

PowerPoint Presentation:
▪should include 15-20 slides including slides summarizing the introduction, the hypotheses to be tested, the methods used, the results and the discussion.
▪the presentation should last 10-12 minutes.

Grading Rubrics:
Total Points: 75 points

List of articles: 10 points
Meeting with Dr. Turcotte

Introduction: 10 points
Need/importance of the study
Importance of the study is supported by background information
Clinical, biological and/or functional significance of the topic is established
Value of the study results is established
Currently known background information is provided
Currently unknown information is discussed
Research purpose stated
Research hypotheses stated

Design and Methods: 10 points
Subject recruitment criteria and methods provided
Experimental & control conditions stated
Protocol details and equipment used stated
Statistical methods used

Results: 10 points
Results organized and easy to understand
Physiological principles behind the results explained
Results compared to other studies

Discussion: 10 points
Summarize the results and compare to expected results
Strengths and limitations of the study discussed
Practical implications of results provided

Future research: 3 points
Suggestions for future research provided
Provided suggestions are plausible and reasonable

Presentation Skills: 10 points
Confident and dynamic
Um's and other fillers are limited
Eye contact with audience is maintained
Professional manner
All group members have a reasonable amount of participation
Discussion follows a logical path
10-12 min in length

Creativity and Originality: 6 points
Interesting presentation and easy to follow
Slides are not repetitive
Slides are not overly wordy
Images are clear and have good resolution
Figures are not cluttered and can be interpreted quickly

Ability to answer questions: 6 points
Answers are coherent and respond to the question
Answers are succinct and complete
Answers are supported by current or previous research

HBIO 302L: Nutrition and Metabolism
Assignment: Poster of Metabolic Pathways

Learning Objectives:
▪to relate the knowledge of nutrition and metabolism to a healthy lifestyle
▪to recommend ways by which dietary and physical activity interventions in different socioeconomic environments could help resolve the obesity epidemic
▪to describe the metabolic pathways associated with lipid and carbohydrate metabolism

Assignment Description:
For this assignment, each student will produce a poster that will describe the eight (8) metabolic pathways plus the Krebs cycle and the electron transport chain that we cover in class. The metabolic pathways included on the poster will be glycolysis, glycogenolysis, glycogen synthesis, gluconeogenesis, beta oxidation, triglyceride hydrolysis, fatty acid synthesis and lipid synthesis. The poster will also include the Krebs cycle and the electron transport chain. The poster should also include all of the transporters that carry the relevant molecules into and out of the cell, endoplasmic reticulum, lipid droplet or mitochondria.

Steps:
There are three phases associated with this presentation.

1) **October & November: As we cover each pathway in class and in the lab, each student should start to create the poster.**
2) **November: During the month of November, you will participate in two labs that are related to the metabolic pathways. Students will make presentations that will help you to complete the poster.**
3) **November 22nd: The poster is due in the conference room in AHF 251 by 9:30 AM.**

Poster:
▪can be drawn by hand or done with a computer program; it must be legible.
▪it must be on a physical board.

Grading Rubrics:
Total Points: 100 points

All enzymes, proteins and transporters must be in their appropriate intracellular location.

All transporter proteins at the plasma membrane such as those needed for (but NOT limited to): glucose, galactose, fructose, FA and glycerol

All Transporter proteins at the mitochondrial membranes (IMM or OMM) including those needed for the following (but NOT limited to): pyruvate, malate, glycerol 3-phosphate, FA-CoA, ATP, ADP, phosphate, citrate, oxaloacetate

1) Carbohydrate Pathways: 40 points
Glucose uptake: Glut transporters as relevant
Glycolysis: all enzymes and co-enzymes, co-factors etc…including the CK reaction where appropriate and the PDH reaction
Glycogenolysis: all enzymes and co-enzymes, co-factors etc…including debranching enzyme and a graphical representation of how this happens (Ferrier, p. 129)
Glycogen synthesis: all enzymes and co-enzymes, co-factors etc…including glycogenin and a graphical representation of how this happens (Ferrier, p. 127)
Gluconeogenesis: all enzymes and co-enzymes, co-factors etc… One of the enzymes of GNG is not located in skeletal muscle. Include this enzyme in your poster and put (liver only) in brackets right by the enzyme name.
Related reactions: LDH, AAT, glycerol 3-phosphate shuttle

2) Lipid Pathways: 40 points
Fatty acid uptake: relevant transporters

Beta oxidation: all enzymes and co-enzymes, co-factors etc…including carnitine shuttle system as well as a graphical representation of how the carnitine shuttle and beta oxidation happen
Triglyceride hydrolysis (lipolysis): all enzymes and co-enzymes, co-factors etc…including all of the proteins that are involved in the activation of the system. You should also make sure that the enzymes are in their proper location.
Fatty acid synthesis: all enzymes and co-enzymes, co-factors etc…including a graphical representation of how the acetyl-CoA units leave the mitochondria and how the synthesis steps happen (Ferrier, p. 185). You should also make sure that the enzymes are in their proper location.
Triglyceride synthesis: all enzymes and co-enzymes, co-factors etc…including a graphical representation of how this happens
Related reactions: LDH, AAT

3) Krebs cycle and ETC: 20 points
All enzymes and co-enzymes, co-factors etc… including the CK reaction where it is appropriate and a graphical representation of how the Krebs cycle and the ETC function.

HBIO 302L: Nutrition and Metabolism
Extra 2% (similar to JEP) Assignment: Seminar Summaries

Learning Objectives

•to develop and execute research hypothesis related to nutrition and health
•to use research articles to defend a scientific argument
•to recommend ways by which dietary and physical activity interventions in different socioeconomic environments could help resolve the obesity epidemic
•to discover and discuss the impact of human diversity as manifested by age, disability, gender, ethnicity and social status on nutritional deficits

Assignment Description:

•If you decide to do this option for extra credit, **you must send an email to Dr. Lopes by Sept 9th, 2022i** to let her know of your decision.

Seminar attendance: An extra credit option of maximum 2% will also be available by attending **4 research seminars** either on UPC or on HSC. **Two (2) of those seminars should be HBIO seminars.** The seminars should be related to some aspect of biology or physiology. For each seminar, students will have to attend the seminar and to write a 1 page summary (single spaced) of what was presented by the researcher. **The 1-page summary should include an introduction, an organized summary of the research presented and a conclusion.** For each seminar attended and 1-page summary submission, students can be given up to 0.5% for a grand total of 2% points (for 4 attended and summary). Summaries **MUST** be emailed to Dr. Turcotte **within 1 week of the seminar.** Students must clearly explain which seminar was attended (see description below).

Grading Rubrics:
Total Points: 2 points

Each summary will be forth 0.5 point for a possible maximum total of 2 points.

For each summary (worth 0.5 point):

1) Introduction: 25% of 0.5 point
The student will introduce the speaker and topic to be covered by the speaker.

2) Discussion of results presented by speaker: 50% of 0.5 point
The student will discuss the results that were presented. This section of the summary should be logically organized so that the reader can follow the results and the reasons behind each experiment.

3) Conclusion: 25% of 0.5 point
The student will summarize the seminar findings and include the presenter's discussion of their findings. The student should also provide information about whether the seminar was interesting, provided enough data and/or any other opinions about the seminar.