

# English Technical Writing

Gerry Rau  
Fall 2023 (112-1)  
Class 6

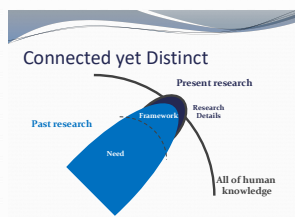
1

# Feedback

2

## Framework

- I love the diagram in PPT5 page 30-31. I can see that the research details is build on the framework, and outperforms previous work.



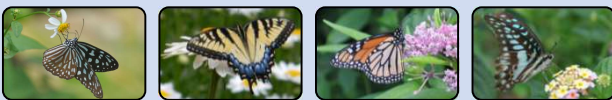
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## Learning

- After receiving your comment on my last homework, I know how to present my writing more scientifically, making it easier for readers to understand.
- That is the goal!

4

## Analyzing your Contribution



Peer Review  
and  
Work Time

Highlighting  
your  
Contribution

Assignment

Looking  
Ahead

## Peer Review and Work Time



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## Peer Review

- Look at one another's work
  - Particularly last week: Components in Process division
- Does your partner have all the required information?
  - 3 tables/division, 1 summary/division
- Do you agree with their components/markers?
- Are their tables clear, well-formatted?
- Any questions – ask

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## Work Time

- Based on comments from your partner or instructor
  - Improve your summary, tables

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## Components in the Last Two Divisions

Exercise 6.1



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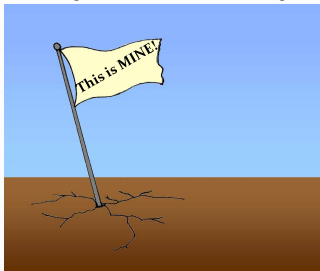
## Staking your Claim

10

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## Staking your Claim

“To pound wooden stakes into the ground to mark off an area of formerly unclaimed land as your own”



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## Staking your Claim



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## Staking your Claim

Verify the value of what you have discovered!  
(R&D or P&C Div.)

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## Staking your Claim

Verify the value of what you have discovered!  
(R&D or P&C Div.)

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## Evaluate your Understanding

1. Why are the last two divisions discussed together in this chapter?
2. What is the purpose of each component found in the last two divisions?
3. How do science and engineering articles differ in the last two divisions?

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## The Contribution of your Work

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## The Contribution of your Work

### Implicit Claims in 3<sup>rd</sup> and 4<sup>th</sup> Division

<b>IMRD</b> (Reliability)	You have a <b>good explanation</b> for your data.
	R & D are often combined
<b>IPTC</b> (Feasibility)	Your solution is <b>better than</b> other existing solutions.
	C is usually very short

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## Science

**IMRD** (Reliability) You have a **good explanation** for your data.

IMRD (Science)	
Division	Components
Results	Data patterns
Discussion	Comparisons
	Interpretations
	Conclusion

Evidence (Results)  
Often statistical  
Reasoning (Discussion)  
Summary / Conclusion

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## Engineering

**IPTC**  
(Feasibility) Your solution is **better than** other existing solutions.

IPTC (Engineering)		
Division	Components	
Testing	Testing methods	➤ <b>For comparison</b>
	Data patterns	➤ <b>Evidence</b>
	Comparisons	➤ <b>Reasoning</b>
	Interpretations	➤ <b>Often few, short</b>
Conclusion	Conclusion	➤ <b>Advantage / Contribution</b>

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## Evaluate your Understanding

1. Why are the last two divisions discussed together in this chapter?
2. What is the purpose of each component found in the last two divisions?
3. How do science and engineering articles differ in the last two divisions?

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## Components in the 3<sup>rd</sup> and 4<sup>th</sup> Division

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## Data Patterns

Component	Data Patterns			
Sub-component	General Patterns	Data Transformation	Exceptions to Patterns	Classification of Patterns
Claim & Support	Graphics: Figures, Tables	Log transform etc.	Exceptions, outliers, or data errors	Grouping data
	(Both)	(Science)	(Science)	(Science)

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## Comparisons

Component	Comparisons				
Sub-component	Within the article	With prediction (hypothesis)	With expectations	With theoretical ideal	With previous work
Claim & Support	Different parameters	Statistical testing	Informal prediction	Optimum value	Other designs
	(Engineering)	(Science)	(Engineering)		(Both)

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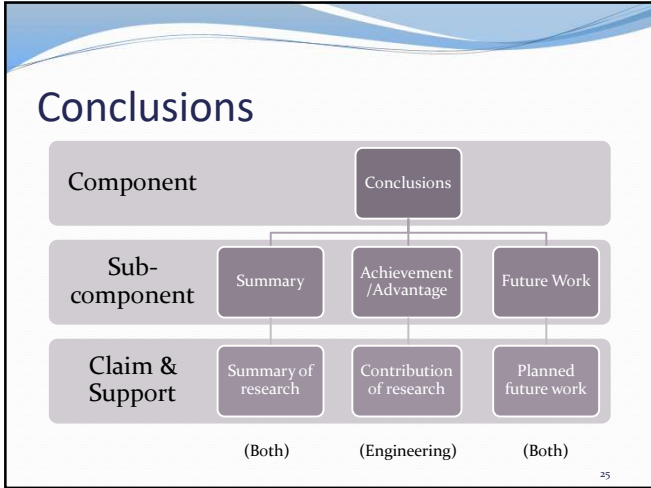
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## Interpretations

Component	Interpretations				
Sub-component	Analysis methods	Cause of results	Elimination of causes	Practical applications	Limitations
Claim & Support	How we evaluated data	Explanation of data pattern	Lack of support for explanation	Potential applications of the new knowledge	Limited range of testing or advantage
	of: Comment				
	Clarify the results	(Both)			(all others mostly Science)

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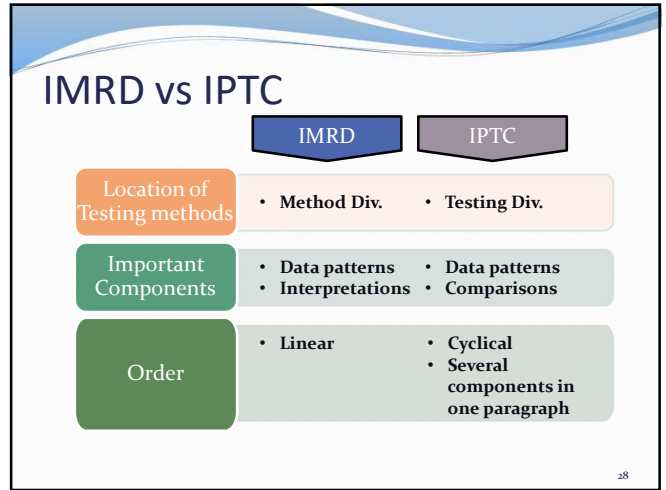
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- ### Evaluate your Understanding
1. Why are the last two divisions discussed together in this chapter?
  2. What is the purpose of each component found in the last two divisions?
  3. How do science and engineering articles differ in the last two divisions?

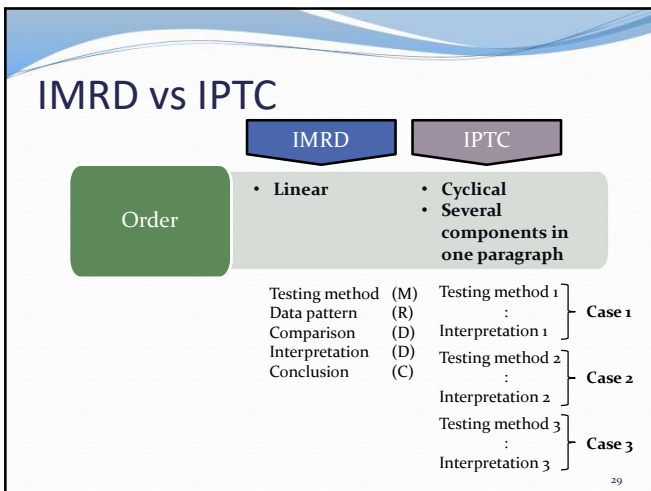
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## Comparisons between IMRD and IPTC

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### Exemplar presentations

• Introduction	9/26	Neo
• Process/Method	10/3	Hai
• T&C / R&D	10/17	Charles
• Citations	10/24	Tran
• Graphics	10/31	Charlene

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# Exemplar Oral Presentation T&C / R&D

Presenter : Jenny  
Advisor : Prof. Gerald Rau

2021.10.21

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## Five components in T&C / R&D

- 6 Testing methods** To allow comparison
- 7 Data patterns** To allow comparison
- 8 Comparisons** With previous solutions
- 9 Interpretations** May not be required
- 10 Conclusion** Summarize contribution

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## Section titles in article

Division	Section/Subsection Titles
I	I. INTRODUCTION
P	II. BACKGROUND PRINCIPLE A. L-Type Network With One Varactor B. $\pi$ -Type Network With Two Varactors C. $\pi$ -Type Network With Three Varactors
T	III. DESIGN PROCEDURE IV. CIRCUIT DESIGN AND EXPERIMENTAL RESULTS A. L-Type Network Reflection Load B. $\pi$ -Type Network Reflection Load V. DISCUSSION A. Comparison With Conventional 50-Quarter-Wavelength Transmission Lines With Two Stub Shunted Varactors Reflection Loads [17] B. Benchmarking
C	VI. CONCLUSION

Burdin, F., Iskandar, Z., Povedin, F., & Ferrari, P. (2015). Design of compact reflection-type phase shifters with high figure-of-merit. *IEEE Transactions on Microwave Theory and Techniques*, 63(6), 1883-1893. 33

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## IV. CIRCUIT DESIGN AND EXPERIMENTAL RESULTS

### A. L-Type Network Reflection Load

In order to confirm the calculus, Fig. 10 shows the electrical simulation (with ADS) taking into account practical branch-line coupler and transmission lines. **Simulations were carried out for the whole range of the varactors bias voltage with a step of 2 V. The maximum insertion loss is 0.65 dB at 2 GHz, as shown in Fig. 10(a), which is close to the insertion loss estimated by calculus (0.31 dB + 0.3 dB due to the branch-line coupler), and the 0.25 dB of insertion loss variation also fits well with the 0.2 dB theoretically calculated.** The maximum insertion loss is reached for a bias voltage of 6 V. **As expected, the return loss is better than 10 dB over a 10% bandwidth, as shown in Fig. 10(b), and it is better than 16 dB at 2 GHz. The relative phase shift is equal to 203°, as shown in Fig. 10(c), and was reached for the maximum bias voltage of 20 V, as expected. It is close to the 211° theoretically calculated.** This fair comparison shows that the theoretical calculus is a relevant basis in order to predict the RTPS performance and achieve a very fast optimization of the design parameters.

**Fig. 11 shows the RTPS measurement results. A very good agreement between the simulation results was obtained. As expected, the RTPS is very low loss with 0.63 dB of maximum insertion loss at 2 GHz and 0.18 dB of insertion-loss variation.**

**6c (Simulation testing)**  
Testing was done under realistic simulated conditions

**7a (General pattern)**  
A pattern can be discerned in the data

**8c (With expectations)**  
Data [match/differ from/exceed ...] expectations

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## IV. CIRCUIT DESIGN AND EXPERIMENTAL RESULTS

### B. $\pi$ -Type Network Reflection Load

The design procedure led to a relative phase shift of 373° with  $Z_1 = 120 \Omega$ ,  $\theta_1 = 40^\circ$  and  $Z_T = 30 \Omega$ . **Fig. 12 shows the electrical simulation results based on these parameters. The maximum insertion loss and insertion-loss variation are 1.42 and 1.1 dB, respectively, as shown in Fig. 12(a). The return loss is better than 11 dB over a 10% bandwidth, as shown in Fig. 12(b). The relative phase shift reaches 372°, as shown in Fig. 12(c).**

**Fig. 13 shows the RTPS measurement results. Here again a very good agreement between measurement and simulation results was obtained. The measured insertion loss and insertion-loss variation are 1.56 and 1.16 dB, respectively, at 2 GHz,**

**7a (General pattern)**  
A pattern can be discerned in the data

**8c (With expectations)**  
Data [match/differ from/exceed ...] expectations

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## V. DISCUSSION

### A. Comparison With Conventional 50- $\Omega$ Quarter-Wavelength Transmission Lines With Two Stub Shunted Reflection Loads [17]

In order to carry out a careful benchmark between the reflection load in [17] and the  $\pi$ -type network with two varactors in this paper, the latter **is simulated with the same varactor as the one in [17] at a working frequency equal to 10 GHz.** **Simulation results are summarized in Table I. Comparable electrical performance are achieved, with an FoM equal to about 80°/dB in both cases. Although the  $\pi$ -type network is two var-**

The surface area of the reflective load used in this paper **is much lower than the one in [17], thanks to the use of a much smaller transmission line of 45° instead of 90°. Also, there is**

**6c (Simulation testing)**  
Testing was done under realistic simulated conditions

**7a (General pattern)**  
A pattern can be discerned in the data

**8c (With previous work)**  
Data [support/refute/improve on ...] previous work

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### V. DISCUSSION

**B. Benchmarking**

The performances of the RTPS carried out in this paper were compared to RTPS results published in the literature, considering a working frequency near 2 GHz. Only the RTPS carried out in a PCB technology were considered. The comparison is summarized in Table II. For low relative phase shifts, below 250°, the FoM of the proposed RTPS is more than five times

**8e (With previous work)**  
Data [support/refute/improve on ...] previous work

**7a (General pattern)**  
A pattern can be discerned in the data

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### VI. CONCLUSION

In this paper, new simple RTPS topologies, based on L- and  $\pi$ -type networks, were carried out. All the previous topologies

than 12.3 and 10.9 dB over this bandwidth, respectively. The measured maximum relative phase shift, insertion loss, and insertion-loss variation showed very good agreement with the theoretical calculation prediction and electrical simulations, which demonstrates the efficiency of the proposed design procedure. The comparison to the state-of-the-art showed that better or equivalent electrical performance was achieved with a much more compact device as compared to the classical approach using quarter-wavelength transmission lines.

A perspective would be to focus now on coupled-line couplers to replace the 3-dB branch-line couplers, as shown in [8], in order to get both highest compactness and electrical performance.

**10a (Summary)**  
The research goal has been achieved

**10b (Achievement or advantage)**  
Solution improves on past work

**10c (Future work)**  
Remaining questions can be answered or further improvements made

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### Components in Testing

Section/Subsection	Component Marker	Component
IV./A	Simulations were carried out for the whole range of the varactors bias voltage with a step of 2 V.	6c (Simulation testing)
	The maximum insertion loss is 0.65 dB at 2 GHz, as shown in Fig. 10(a), which is close to the insertion loss estimated by calculus (...), and ... also fits well with the 0.2 dB theoretically calculated.	7a (General pattern) 8c (With expectations)
	As expected, the return loss ... as shown in Fig. 10(b), and it is better than 16 dB at 2 GHz.	8c (With expectations) 7a (General pattern)
	Fig. 11 shows the RTPS measurement results. A very good agreement with the simulation results was obtained.	7a (General pattern) 8c (With expectations)
IV./B	Fig. 12 shows the electrical simulation results based on these parameters.	7a (General pattern)
V./A	In order to carry out a careful benchmark between ... in this paper, the latter is simulated with the same varactor as the one in [17] at a working frequency equal to 10 GHz.	6c (Simulation testing)
	The surface area of the reflective load used in this paper is much lower than the one in [17], thanks to the use of ...	7a (General pattern) 8c (With previous work)
V./B	The performances of the RTPS carried out in this paper were compared to RTPS results published in the literature. ...	8c (With previous work)
	The comparison is summarized in Table II.	7a (General pattern)

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### Components in Conclusion

Section/Subsection	Component Marker	Component
VI.	In this paper, new simple RTPS topologies, based on L- and $\pi$ -type networks, were carried out.	10a (Summary)
	The measured ... showed very good agreement with ... which demonstrates the efficiency of the proposed design procedure.	10a (Summary)
	The comparison to the state-of-the-art showed that better or equivalent electrical performance was achieved with a much more compact device as compared to the classical approach ...	10b (Achievement or advantage)
	A perspective would be to focus now on coupled-line couplers to replace the 3-dB branch-line couplers, as shown in [8], in order to ...	10c (Future work)

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# Thank you !

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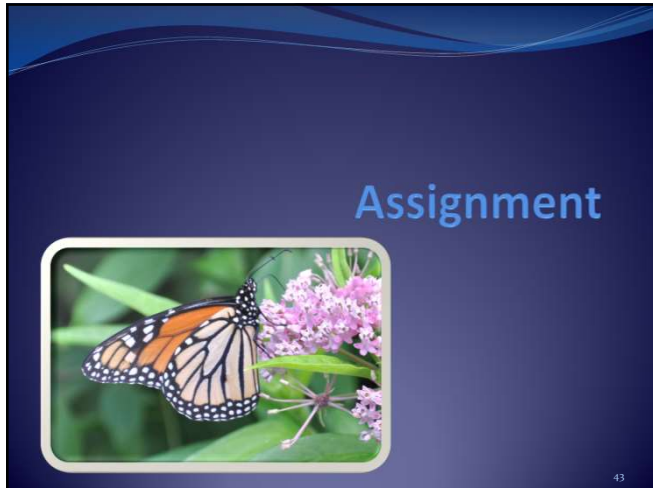
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### Exercise 6.1

- 1) Identify the components in each paragraph in the last two divisions of your first exemplar article and the component markers that help you identify them. Summarize this in a table.
  - Hint: Remember that there is frequently more than one component per paragraph in these divisions.
  - Hint: As you start, look at the section and subsection titles. Do they give you an idea what you will find in each section?
- 2) Does the order of components generally follow the order listed? Do any of them repeat cyclically? Can you figure out a reason for the order?

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## 1 Write

- Last two divisions (R, D) or (R&D, C) or (T, C)
  - 3 Tables, Description
    - Separate or combined – you choose
  - = Homework, chapter 6

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## 2 Turn in

- Peer Review (details below)

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## 3 Read

- Chapter 7.1, 7.2 (Use of citations as evidence)
  - **NOT 7.3, 7.4 (Advanced class)**
- Chapter 25 (Citations and Citation managers)

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## 4 Citation manager

- If you currently use an online citation manager:
- Please have it available on your laptop and be ready to demonstrate how to use it

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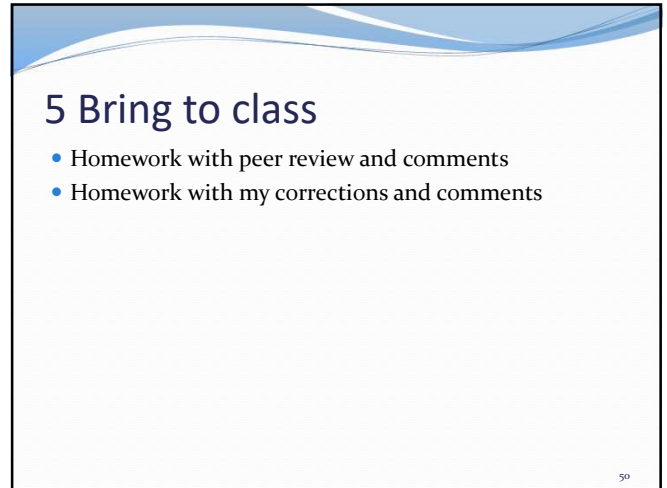
## Download

- If you do not currently use a citation manager:  
Download Endnote from CCU Library

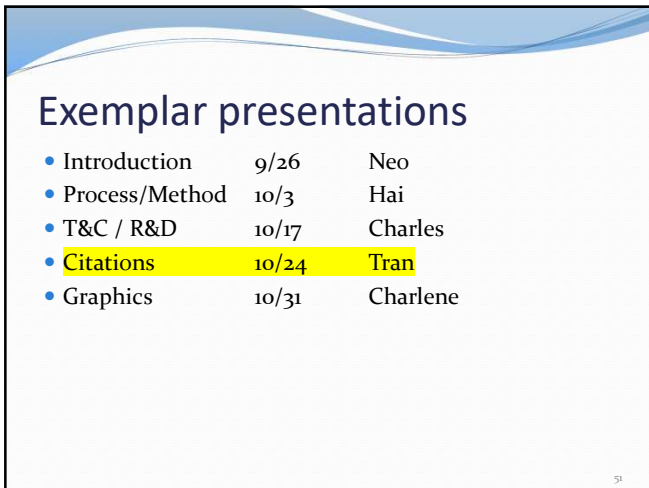
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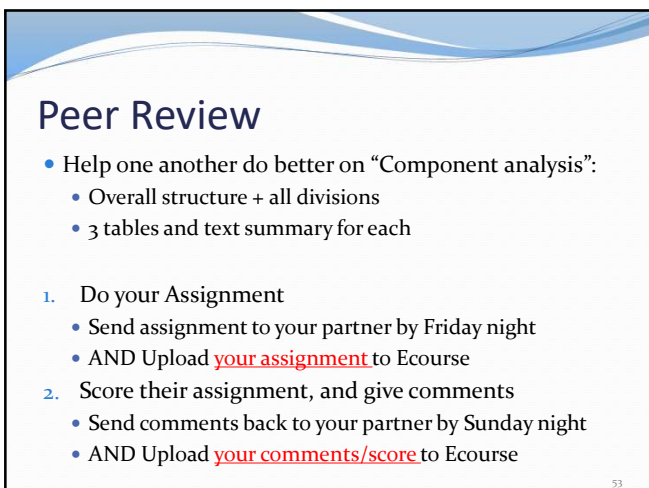
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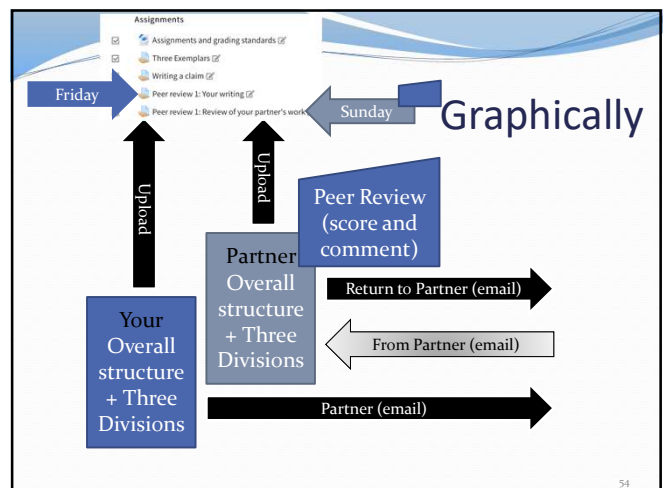
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## Turn in: Two documents

Peer review 1 (5%)  
**Upload two items to ECourse:**  
 Your writing: two days before normal due date  
 Peer review: normal due date

**Your writing: Correct previous work and add Homework ch 5, 6:**  
 Correction of previous work:  
 Correct and remove Track Changes and previous Comments  
 Claim about components found in each division:  
 Do exemplars match the expected format?  
 Support in text:  
 Point to each table, summarize support for your claim  
 Support in tables:  
 One table per exemplar per division, similar to Table 4.1  
 Components in each paragraph, component markers indicated  
 Headings:  
 Every part has a heading, using Styles  
 References:  
 Listed at the end  
**This homework will be resubmitted next week, after further improvement**

**Peer review: Comment on and score your partner's homework:**  
**Comment on your partner's work:** use Review/Comment  
 Are all parts of the homework complete?  
 Is the claim and support (text and tables) clear for each part?  
 Could anything else be improved in content or format?  
**Score your partner's work:**  
 Use the scoring sheet for the following assignment (Component analysis)  
 Give an overall score out of 100 based on the scoring sheet

Your score is based on

Your work

Their work

Your comments

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## Rubric for Peer review

Grading is based on your peer review:

Category/Criteria	0	10	20	30	40	50
<b>Comments</b>						
5: Comments show depth of insight, addressing claim, support, format, as appropriate						
4: Comments show careful reading, address specific features						
3: Helpful suggestions on how to improve						
2: Comments mostly on minor points like spelling						
1: Very few comments						
0: Peer review not done						
<b>Scoring</b>						
5: Justification given for score, clearly stating what could be improved						
4: Score given is similar to instructor's score						
3: Score given for each scoring category, with overall score out of 100						
2: Score given for most categories, or all categories but without an overall score						
1: Score given but scoring sheet not used						
0: Homework not submitted to your partner						

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## Scoring your partner's work

- Use the scoring sheet for "Component analysis"
  - Score your partner's work for each category
  - Give helpful comments on how to improve
- Purpose of peer review
  - Help one another improve before submitting

6	10/17	Analyzing contribution	6	Exemplar article last 2 divisions	Peer Review (5%) 10/20, 22*
7	10/24	Using past research for support	7, 1, 2; 20, 3; 25	Exemplar presentations (2) Citing past research, Reference formatting Exemplar presentations (2)	Component Anal. (10%) 10/29

Corrections

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## Component analysis (following week)

- Corrected version of your work:
  - Overall structure
  - Introduction
  - Process/Methods
  - Testing & Conclusion/Results & Discussion
  - References

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## Where are we going?



Description of Exemplar Articles (Due 11/12)

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## Overall Purpose

- Write a description you or someone in your lab could follow to write a research article
- What features appear to be required or expected?
- What features are optional, authors differ?

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## General Instructions

- Format similar to a journal article
  - Title and author
- Sections
  - Give section titles following format of exemplars
  - Use header for section titles to allow navigation
- Tables
  - Number sequentially
  - Refer to each table in the text: "as shown in Table x"
- References
  - Give full references at end
  - Use citation format of your exemplars

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## What will it include?

- A complete description will include a complete description of three exemplars:
  - Title of homework, author (you!)
  - Overall structure (Exercises 2.1, 3.2)
  - Component analysis** (what is present and where, how do you recognize them?)
    - Introduction division (Exercise 4.1)
    - Method or Process division (Exercise 5.1)
    - R&D or Testing and Conclusion divisions (Exercise 6.1)
- Descriptions should use the Word and reference manager features learned
  - All previous Track Changes and Comments should be removed after correction

Now

Next 2 weeks

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