Schedule of Lectures: "Einstein for Everyone"

Dr. Erik Curiel
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office: Ludwigstr. 23, R126
office hours: by appointment
course website:
http://strangebeautiful.com/lmu/2014-summer-lmu-einstein.html

Summer, 2014
Th. 14:00–16:00 C.T.
Ludwigstr. 31, 021

Contents

Introduction and *Prècis* of Course (Apr. 10)

Required Reading:

1. Geroch (1981, chs. 1–4)
2. Norton (2013, chs. 1, 7)

Holiday: NO LECTURE (Apr. 17)

Special Relativity (Apr. 24–May 15)

Historical Background; Einstein's Path to Special Relativity (Apr. 24)

Required Reading:

1. Norton (2013, ch. 8)
2. Einstein (1905) (on course website)
3. M. Janssen, handout "19th Century Ether Theories" (available on course website)

Holiday: NO LECTURE (May 01)

Basics of Special Relativity (May 08)

Required Reading:

1. Norton (2013, chs. 2–4)
2. Janssen (2013a) (on course website)
3. Mermin (2005, chs. 1–7)

"Paradoxes"; $E = mc^2$; Spacetime; Philosophical Significance of Special Relativity (May 15)

Required Reading:

1. Norton (2013, chs. 5–6, 9–13)
2. Janssen (2013a) (on course website)
3. Mermin (2005, chs. 9–11, 13)

General Relativity (May 22–Jun. 12)

From Euclid to Riemannian Geometry; Newtonian Gravity; Einstein's Path to General Relativity (May 22)

Required Reading:

1. Cohen (1985, ch. 7) (on course website)
2. Einstein (1914, selections) (on course website)
3. Mermin (2005, ch. 12)
4. Norton (2013, ch. 20)

Holiday: NO LECTURE (May 29)

Basics of General Relativity (Jun. 05)

Required Reading:

1. Geroch (1981, chs. 5–7)
2. Norton (2013, chs. 18–19)

Relativistic Cosmology; Black Holes (Jun. 12)

Required Reading:

1. Geroch (1981, ch. 8)
2. Norton (2013, chs. 21–24)
3. Smeenk (2013) (on course website)

Holiday: NO LECTURE (Jun. 19)

Statistical Mechanics (Jun. 26)

Brownian Motion (Jun. 26)

Required Reading:

1. Norton (2013, chs. 25)

Quantum Theory (Jul. 03–Jul. 10)

Origins of Quantum Theory; Einstein and the Photon (Jul. 03)

Required Reading:

1. Einstein (1965) (on course website)
2. Norton (2013, chs. 26–27)

Einstein and the Photon; Einstein-Podolsky-Rosen Paradox (Jul. 10)

Required Reading:

1. Einstein, Podolsky, and Rosen (1935) (on course website)
2. Norton (2013, chs. 28–29)

PAPER DUE (Sep. 19)

References

Cohen, I. (1985). *The Birth of a New Physics* (Revised and Updated ed.). New York: W. W. Norton & Co.

Einstein, A. (1905). On the electrodynamics of moving bodies. See Lorentz, Einstein, Minkowski, and Weyl (1952), pp. [***]. W. Perrett and G. Jeffery, translators.

Einstein, A. (1914). On the relativity problem. See Lorentz, Einstein, Minkowski, and Weyl (1952), pp. [***]. Originally published as "Zum Relativitätsproblem" in *Scientia* 15, 1914, pp. 337–348.

Einstein, A. (1965, May). Concerning an heuristic point of view toward the emission and transformation of light. *American Journal of Physics 33*(5), [***]. Translation of the original German published in *Annalen der Physik* 17(1905):132–[***].

Einstein, A., B. Podolsky, and N. Rosen (1935). Can quantum-mechanical description of physical reality be considered complete? *Physical Review 47*, 777–780.

Geroch, R. (1981). *General Relativity from A to B*. Chicago: University of Chicago Press.

Janssen, M. (2013a). Appendix on special relativity. See Janssen (2013b), Chapter [***], pp. [***]. Forthcoming.

Janssen, M. (Ed.) (2013b). *Cambridge Companion to Einstein* (Second ed.). Cambridge: Cambridge University Press. Forthcoming.

Lorentz, H., A. Einstein, H. Minkowski, and H. Weyl (1952). *The Principle of Relativity*. New York: Dover Press, 1952. W. Perrett and G. Jeffery, translators.

Mermin, D. (2005). *It's About Time: Understanding Einstein's Relativity*. Princeton, NJ: Princeton University Press.

Norton, J. (2013). Einstein for everyone. http://www.pitt.edu/~jdnorton/teaching/HPS_0410/chapters_2013_Jan_1/index.html.

Smeenk, C. (2013). Einstein's role in the creation of relativistic cosmology. See Janssen (2013b), Chapter [***], pp. [***]. Forthcoming.