Errata for the first edition:

1) Page 13: In equation (1.25) the third line up from the bottom the first two terms should be: $d\rho^2\sin^2\varphi + \rho^2 d\varphi^2\cos^2\varphi$.
2) Page 27: Part 1 of Exercise 1.13 should read "where the coefficients a_{ij} are constants satisfying $a_{ij} = a_{ji}$."
3) Page 46: The argument around equations (2.15) and (2.16) is wrong. What it should say is that the components of the vector V do not change under the transformation ($x^i \rightarrow x^i + a^i$) and then elaborate further. Since this is not important to our discussion, I have decided just to recommend removing between "Although we will mostly focus …" and equation (2.16) inclusive. Similarly and for the same reason, on the bottom of page 52 remove between "As pointed out earlier …" and equation (2.41) inclusive.
4) Page 45: Equation 2.11 has the minus sign in the wrong place it should be:

Rotations about the x^2 and x^3 axes are respectively

$$[\lambda]_{x^2} = \begin{pmatrix} \cos\theta & 0 & \sin\theta \\ 0 & 1 & 0 \\ -\sin\theta & 0 & \cos\theta \end{pmatrix} \tag{2.11}$$

$$[\lambda]_{x^3} = \begin{pmatrix} \cos\theta & -\sin\theta & 0 \\ \sin\theta & \cos\theta & 0 \\ 0 & 0 & 1 \end{pmatrix} . \tag{2.12}$$

5) Page 52: Footnote 8, 2nd line: "Since each index counts from 1 to 3, each of the nine equations contains nine terms, giving a total of 27 terms altogether." the total number of terms should be 81, not 27.
6) Page 58: Footnote 11, the phrases "physical basis" and "natural basis" should be switched.
7) Page 80: Equation (3.6) the last term $dx^{i`}$ should be replaced with $dx^j$ (i.e. $i` \rightarrow j$).
8) Page 81: From the top of the page (right before equation 3.7) to right before equation (3.10) should be replaced with:

The dependence on $d\lambda$ in the first two terms vanishes as follows:

$$\left(\lambda_j^{i'} d\lambda_{i'}^k + \lambda_{i'}^k d\lambda_j^{i'}\right) x^j \hat{\mathrm{e}}_k = d\left(\lambda_j^{i'}\lambda_{i'}^k\right) x^j \hat{\mathrm{e}}_k = d\left(\delta_j^k\right) x^j \hat{\mathrm{e}}_k = 0. \tag{3.7}$$

Hence (3.6) reduces to

$$d\mathrm{r}' = dx^i \hat{\mathrm{e}}_i = d\mathrm{r}, \tag{3.8}$$

Since $\mathbf{v} = \frac{d\mathbf{r}}{dt}$, we also know that the velocity transforms correctly. A problem arises, however, when we get to the second derivative, i.e. acceleration:

$$\begin{aligned} \mathrm{a}' &= \frac{d\mathrm{v}'}{dt} = \frac{d}{dt}\left(v^{i'}\hat{\mathrm{g}}_{i'}\right) = \frac{dv^{i'}}{dt}\hat{\mathrm{g}}_{i'} + v^{i'}\frac{d\hat{\mathrm{g}}_{i'}}{dt} \\ &= \lambda_{i'}^j a^{i'}\hat{\mathrm{e}}_j + v^{i'}\frac{d\lambda_{i'}^j}{dt}\hat{\mathrm{e}}_j = a^j\hat{\mathrm{e}}_j + v^{i'}\frac{d\lambda_{i'}^j}{dt}\hat{\mathrm{e}}_j = \mathrm{a} + v^{i'}\frac{d\lambda_{i'}^j}{dt}\hat{\mathrm{e}}_j. \end{aligned} \tag{3.9}$$

The required transformation $\mathrm{a}' = \mathrm{a}$ is ruined by the presence of the second term:

9) Page 111: Exercise 3.26 should be two dimensional. The velocity **v** should be replaced with components (5, 2, 0). The words "except in three dimensions" to be removed. Similarly, problem 3.27 on page 113 the same words should be removed. Also change exercise 4.7-3 to make it two dimensional by dropping the *z* component of the velocity.

10) Page 123: Equation (4.26) the left hand side should have the same indices on *U* and *V*.

11) Page 130: Exercise 4.7-2, let **v**=(0.7*c*, 0.5*c*, 0.2*c*) instead of the given numbers.

12) Page 136: Exercise 4.13 should be entirely replaced by: *An observer at rest in some orthogonal frame of reference O sees the location of an event happening at x = 500m and ct = 600m. Another observer O' on a frame of reference traveling at a speed v = 0.3639c with respect to O sees the same event at different spacetime coordinates. Draw an accurate to-scale spacetime diagram to describe the situation and find x' and ct' from it; i.e. the location of the event as measured by O'. Verify your result analytically using the Lorentz transformations. Your graphical results should be within about 20% of your analytical ones.*

13) Page 170: 3rd line: "… Galileo, who proved it experimentally over 500 years ago." should be 400 years.

14) Page 187: The metric (5.61) is missing factors of *r* in each term. It should be as follows. The form (5.67) is correct.

$$ds^2 = -\frac{c^2}{4}\left(3\sqrt{1-\frac{2GM}{ac^2}} - \sqrt{1-\frac{2GM}{a^3c^2}r^2}\right)^2 dt^2 + \frac{dr^2}{\left(1-\frac{2GM}{a^3c^2}r^2\right)} + r^2 d\Omega^2. \quad (5.61)$$

15) Page 206: The second line, $d\Omega$ should be squared.

16) Page 214: in equation (6.18) the last term should be $2/c^2$ instead of $2/c$.

17) Page 217: Equation (6.25): the last component of the 4-velocity should be just ω, NOT $R\omega$ since we are using natural basis vectors.

18) Page 224: In the line before equation (6.52) and again the line after equation (6.54) the definition of E should be $E=cP^0$.

19) Page 225: in equation (6.56) the last term has a missing factor of c, i.e. it should be $-cg_{i0}P^i$.

20) Page 234: Exercise 6.25. It is enough to do the first part of this problem. The second part needs revision.
21) Page 237: Exercise 6.28, although probably obvious, let me just clarify that the second calculation should be for the case of constant angle θ, i.e. the time derivative of θ is zero.
22) Page 243: 2^{nd} paragraph, 3^{rd} line, the reference FIG [5.11] should be FIG [6.9].
23) Page 245: The first paragraph of section 6.2.7, the reference "Starting with (6.110)" should be (6.109). Same on page 246 in the line before equation (6.125).
24) Page 248: 2^{nd} line after Fig. [6.10], the place of aphelion and perihelion should be exchanged. Same for Fig. [6.10] on the same page and exercise 6.44.
25) Page 263: in equation (7.13) dy^{κ} should be dx^{κ}.
26) Page 265: The discussion towards the bottom of the page is incorrect, the components of the Riemann curvature tensor *do* diverge at the Schwarzschild radius if one uses Schwarzschild coordinates. The correct argument is that *only* scalar invariants, like Kretschmann's scalar and the Ricci scalar are well behaved at $r = r_s$ in *any* system of coordinates describing a Schwarzschild manifold.
27) Page 291: Second line after equation (8.10): "it evaluates the variation of x at the fixed initial and starting points." Should be initial and final points.

28) Page 317: Equation 8.142. The *M* subscript in the left hand side should be removed.
29) Page 318: Equation 8.146. The second term in the parenthesis should be multiplied by ¼ $g_{\mu\nu}$.
30) Page 353: The sentence "The bein language, then, is a formulation of geometry to the coordinate/metric-based formulation we have been working with, and as such the entire structure of general covariance can be rewritten in terms of this." should be rewritten to "The bein language, then, is a formulation of geometry *equivalent* to the coordinate/metric-based formulation we have been working with, and as such the entire structure of general covariance can be rewritten in terms of *it*.".